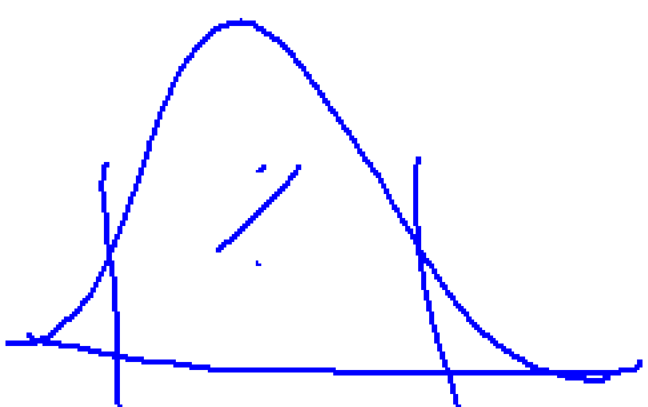
150 ± 3.29

$\bar{X} \pm z^* \cdot \frac{\sigma}{\sqrt{n}}$

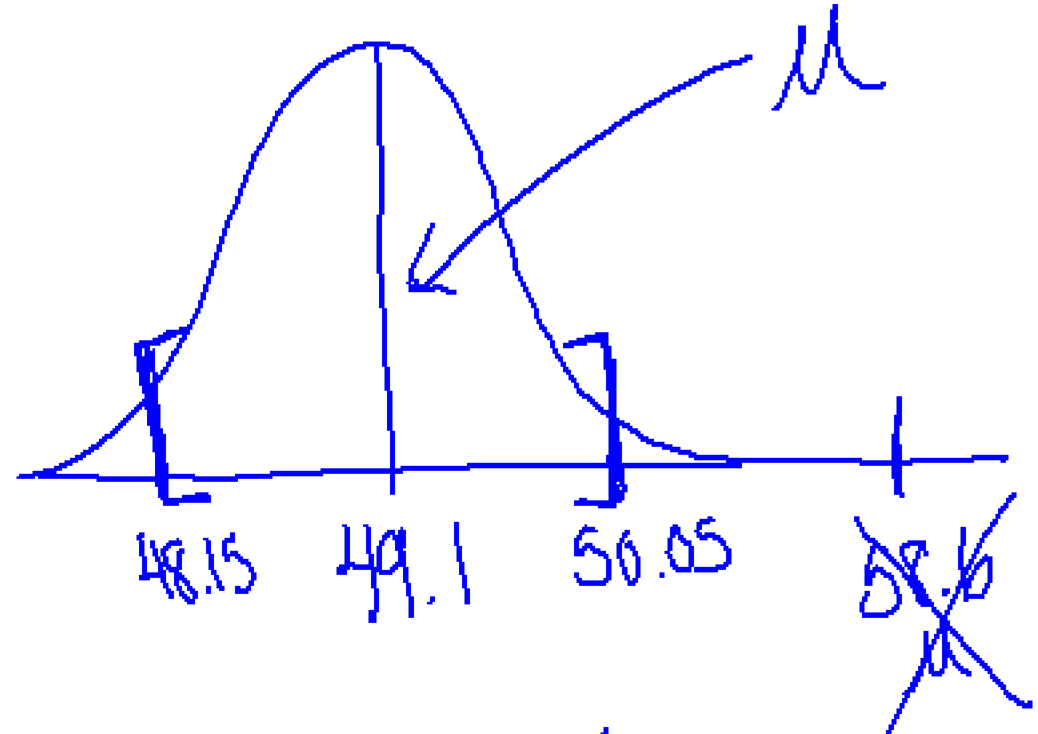
$3.29 = z^* \cdot \frac{\sigma}{\sqrt{n}}$

$3.29 = \frac{(1.645)(\sigma)}{\sqrt{25}}$



$-z$ z

2 sided tests and confidence intervals



$\mu = 48.5$

1) Hypotheses:

   Ho: m = 58.6

   Ha: m $\neq$ 58.6

2) 2-sided test

3) 0.05 $= \alpha$

4) ~~Z = -19.64~~

   ~~p-value = 8.32×10^{-86}~~

   ~~REJECT Ho~~

Outside

5) 49.1 $= \bar{x}$

6) 58.6 $= \mu$

7) (48.15, 50.05) = 95%

2-sided tests and confidence intervals

* can be used for... 2 sided test ($\neq$)

* conf. level must "match" with... α

  * Examples: $\alpha = 0.05$ C.L. = 95%

    $\alpha = 0.01$ C.L. = 99%

Steps:

- Write hyp ($\neq$)
- Determine α => determine conf. level.

- create conf. interval (a, b)
- Look at where μ (claim) falls

- Determine conclusion:
  - Reject if μ falls outside

  - Fail to reject if μ falls inside

- Written conclusion:

  * reject/fail to reject @ $\alpha = 0.0$ ______

    b/c the claimed μ falls outside/inside the ______ % conf. interval.

* We have suff. evid that . . . .

① $\mu = 61.3$

$\bar{x} = 61.79$

$\sigma = 4.5$

$n = 24$

$\alpha = 0.05$

$H_o: \mu = 61.3$

$H_a: \mu \neq 61.3$

95% conf. int:

$\bar{x} \pm z^* \sigma/\sqrt{n} = (59.99, 63.59)$

- We fail to reject Ho @ $\alpha = 0.05$ b/c the claimed μ falls inside the 95% conf interval.
- We have suff. evid. that the true average weight of male runners is 61.3 kg.

(2) $\mu = 105$

$n = 12$

$\bar{x} = 104.13$

$\sigma = 5$

$\alpha = 0.01$

$H_0: \mu = 105$

$H_a: \mu \neq 105$

99% interval:

$\bar{x} \pm z^* \sigma/\sqrt{n} = (100.41, 107.85)$

- We fail to reject H_0 @ $\alpha = 0.01$ b/c our claimed μ falls inside our 99% conf. interval.

- We have suff. evid. that the true avg. radon level is 105 units.